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Designing a Multimodal Environment for Cognitive and Creative Activity in Pre-School Education – Competence of the Teacher

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Abstract: This article focuses on the formation of pedagogical competence for the design of multimodal educational environment, the functionality of which is the foundation of the cognitive and creative activity of the child in pre-school age. It problematizes the need for adequate professional reflection of the teacher in the context of the transgressive approach and highlights the parameters of organizing pedagogical interactions that utilize multimodality as a communication phenomenon. The understanding that the competence of the teacher for designing a multimodal environment as well as cognitive and creative activities develops as transgressive and is continuously created in the cultivation of new knowledge and skills, while expanding the cognitive and practical limits of the subject, is affirmed. Based on this affirmation, the thesis that if a child has entered the "communicative state" and has engaged in multimodal educational interactions, the child appropriates the social experience by forming a transgressive attitude of behavioral response.

Keywords: pedagogical competence, transgressive behavior, multimodal educational environment, cognitive and creative activity of the child in pre-school age.

Introduction

Nowadays, the channels for storing and passing on information are technologically-changed, which is why modern communication is defined as multimodal. The "transition from paper to screen/monitor/display" (Kress, 2003: 190) has been pointed to as emblematic of this transformation. This transformation reveals the peculiarities of the media practices and their cultural resonance reflects a new understanding of literacy in contemporary society.

The term multiliteracy is introduced and meaningfully represented as "including multimodal textual practices, such as linguistic, visual, audio, gestural, and spatial modes, as well as the existing culturally grounded literacies " (Cope and Kalantzis, 2000: 207). In defining the purpose for the introduction of this term, the need to capture the "increasingly complex range of multimodal practices required to understand, manage, create and transmit knowledge" (Taylor et al., 2008: 274) is prioritized.

In the context of a stable research perspective of multimodality as a communication phenomenon, the new idea of literacy determines concepts such as visual and multimodal literacy (Kress, 2003), digital literacy, digital-and-information literacy (Bawden, 2001: 218-259), technological literacy, spatial literacy, historical literacy, political literacy, media literacy, information literacy and multicultural literacy (Abilock, 2008: 7-14) as well as digital-and-media literacy (Hobbs, 2010: 3-63). Given the category-determined autonomy of information, visual, multicultural, and media literacies, Sean Cordes describes them as "a group that can be thought of as a competent if not thorough description of some features of multimodal literacy in both theory and practice". However, he specifies that "although these literacies are not new, the idea of their interaction creates an object that is more than the sum of its parts and has a different perspective from the traditionally divided notions of literacy" (Cordes, 2009: 3).

Prerequisites with potential for the development of multiliteracy are contained in the theories of social semiotics, communication, and the concepts of social and pedagogical facilitation. It is established that the formation of multiliteracy is a consequence of: 'situatedness based on the specificity of individual

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experience with information, of flexible instructions contributing to finding a form of self-expression in the process of communication, of a critical view that allows information to be related to the social context and individual needs, of the practice of transforming the system of meanings and meanings from one context to another' (Kolesnikova, 2013: 7). At the same time, within the scope of more recent theoretical levels of problematisation, the use of a term that denotes the specific internal structural dynamic of an emerging literacy is also registered - transliteracy as "the ability to read, write and interact using a variety of platforms, tools and media, from signs and oral signals, including hand-written text, printed text, television, radio and film, and culminating in digital social networks" (Wilkinson, 2016: 34).

The idea that the agents of socialisation in the present are the practical skills of orientation, power and influence in the multimedia environment is increasingly asserted, because the person (the child) of the new time transcends the strict confines of a national subject, of a professional, a specialist or representative of a particular community limited within state boarders and enters a new identity - one in which the social subject becomes a citizen of the global society. It is this specific contextuality that requires an attitude of transgressive behaviour in the subject (including the group subject) to actively engage, initiate and implement change.

When analysing the changes in the social situation of development, Sir Ken Robinson notes that "we are still preparing children for the world that is fast disappearing, not the world that is fast emerging" (Robinson, 2015). Respectfully accurate is another observation that 'the potential in the pre-school age remains unused and there seems to be reason to suspect that even on a more global scale the main concern of pedagogy is how to contain the development (of the child) in order to bring it within the rapidly ageing notions of the previous generation or, alternatively, within its own canons' (Dimitrov, 2012: 48). The warning that a lack of multimodal literacy is "a prerequisite for a debilitating inferiority with respect to the future" is also alarming (Danov, 2020: 37).

These propositions provoke a revision (revision) of the pedagogical interactions in the kindergarten as an environment that is called upon to further develop, to build upon not only the experience of 'living with others' within the context of a personal perspective, but also the activity of constatand extention of the cognitive boundaries.

The debate on transgressive behaviour as metacognition (metaknowledge) in continuum

There is a body of research that explores the relationship between transgressive behavior and the dynamics of the learners' creative behavior (creative resources). In a study conducted by Wróblewska (2015) the following question is asked: which subjective creative traits, supported by a predisposition to transgressive behaviour, constitute the corelations determining success? In the search of hypothetical determinants of success, an attempt is made to empirically test the relationship between creative competencies (as subjective creative characteristics) and the willingness to engage in transgressive behaviours. The personal positive activation (subjective-caused activity) is understood as a specific activity and set of nonconformist traits stimulating a person's potential creativity in the cognitive and behavioral spheres. It is claimed that creative subjective resources (the level of creative attitude) and personal positive activation favor transgressive activities. According to the author, subjective creative traits, supported by a predisposition to transgressive behavior, represent correlates that determine success.

The creativity-oriented person functions in relation to a specific mechanism, the essence of which is an interaction reflecting the feedback principle of the following elements: (1) potential cognitive creative talents or gifts; (2) activation of the personality - stopping or stimulating the activity of the emotional and motivational sphere in the development of creativity in the cognitive sphere and its manifestation in behavior; (3) evaluation of the effects on one's own activity - creative or adaptive. As a result, creative characteristics expressed in the creative attitude coexist with transgressive behavior: pro-creative motivation in seeking changes, non-conformism, focus on activity and overcoming problems, openness and courage to take on new tasks, innovation and acceptance of novelty.

M. Wróblewska' study shows that "non-conformism is associated with transgressive behaviour as it includes: prevalence, activity, courage, spontaneity, consistency, originality and high self-esteem. The higher the level of creative attitude and its elements in the cognitive (heuristic behaviours) and characterological (non-conformist orientation) spheres, the stronger the links with various manifestations of transgression: attitude of dominance over others, motivation to enhence competences, innovation in designing new solutions and courage to take on new tasks" (Wróblewska, 2015: 248).

The way in which M. Wróblewska describes creative competencies puts them in the perspective of

the transgressive concept of man, focused on the description of behaviours reflecting not only active and deliberate participation in changes, but their initiation and creation. In terms of the individual, the most important thing in applying transgressive behaviors is to go beyond personal capabilities (limits) in every dimension of the individual's functioning. Thus, the person simultaneously builds his/her potential for implementing the resulting transgressive behaviors. Central to motivating the individual to act beyond his or her capabilities are the mechanisms of self-presentation, self-valorization (self-promotion of one's own value), and enhancement of one's own competencies to serve as confirmation of one's own value and its growth. The individual must have an appropriate level of self-awareness to be able to understand his own possibilities to act and how to implement them. J. Kozielecki's thesis is relevant here as he affirms, "You cannot go beyond material or social limits, you cannot go 'one step further' without knowing the structure of the world, especially without knowing where the limits of human abilities and achievements are" (Kozielecki, 2004: 59). For the author, "every modern person has, to a greater or lesser extent, the intellectual and praxeological capacity to create transgressions, if not in historical manner, then at least in psychological one. Those who have never used the power of their generative mind have lost the chance they have received from nature, society and culture" (Kozielecki, 2004: 71).

On the basis of this study, M. Wróblewska comes to the conclusion that creative competences, considered from the transgressive perspective, similarly to the creative approach, are determining for the active person who creatively transforms the environment and her/himself. He is an active agent, able to think and act transgressively, focused on change and development. The factors distinguishing the specificity of transgressive behaviour identified in the analysis of the study may favour practical actions directed towards the physical world (transgression towards things); actions and behaviours directed towards other people (transgression towards others); creative actions that enhance knowledge about the world (symbolic transgression) or self-creative activities leading to self-development (transgression towards oneself).

The latter are particularly important because they arouse cognitive curiosity, increase motivation to act and develop abilities and creative skills. According to Wróblewska (2015), this may imply that subjective creative traits supported by a predisposition to transgressive behaviour (and vice versa) represent important personal resources, and undertaking transgressive actions indicates the individual's active participation in the deliberate transformation of the way of achieving goals to one that is successful. The author emphasizes that in the contemporary conditions, and especially within the context of the development of self-awareness, the urge for transgressive behavioral respondse in adolescents is becoming a necessity, especially with an accent on the awareness of personal resources and the motivation to apply them.

Cognitive and creative activity in a multimodal learning environment

Children have a need to form their own identity and it is in the course of mutually oriented communication, through the continuous presentation of the self, that they discover themselves and explore the world they inhabit. In the field of postmodern pedagogy, Cl. Sapundzhieva interprets the understanding that "the relationship Self - Other(s) is defiened by a conscious binding, this bind is taught (learned) and is the subject to collective rules" (Sapundzhieva, 2005: 93). Taking into account and conforming to this course of natural developmental, directs the teacher towards stabilizing the child's active life position, i.e. - towards his/her development as a subject of activity. From the point of view of subjectivity, activity is primarily related to previous experience, needs, attitudes, goals and motives, to personal meaning and to the manners of carrying out the activity.

Psycho-pedagogical theories of early childhood development emphatically stress that "over time, children's literacy moves from unconventional to conventional practices" (Yaden, Rowe and MacGillivray, 1999: 25). In line with the understanding that learning in preschool is not a leading activity, the validation of this principle finds expression in the need to organise a multimodal learning environment in the kindergarten: an environment oriented as much as possible towards children's communicative modes, in which children use their own semiotic resources/signs to create an image of themselves (Kress, 2009) and construct their own theories of the world (Gardner, 1993).

The multimodal learning environment is based on the simultaneous activation of specific sensory functions: visual, auditory, tactile and motor. This means that the educational content is structured as a composition of speech, facial expression, gesture, images, music, and movement to support each child in the cognitive process by activating his or her leading representational system. Neil Fleming deploys this approach in the design of the VARK model, which incorporates the four sensory modalities: visual, auditory,

theoretical, and kinesthetic. By incorporating a variety of activities and offering multiple communicative modes (including digital), the teacher in effect works with the individual cognitive style of the children (visual, auditory, theoretical and practical) and achieves readiness and interest for new cognitive activity. As Neil Fleming himself notes, "I sometimes believe that children and teachers invest more trust in VARK than it deserves. You can like something and be good at it or not. VARK simply informs how you prefer to communicate. It tells you nothing about the quality of that communication" (Fleming and Baume, 2006: 7).

The modes of communication used and their various resources are an implicit component of forming cognition because in the process of mediated interaction meanings are specified or actualized in the minds of the communication partners. These meanings are interpreted in the different contexts of communication (linguistic, situational-and-psychological, social, historical) and contribute to the embedding of a meaning in an information exchange. By extending the range of interaction with peers and adults, children enrich the repertoire of activities (games and expressive, constructive, musical, verbal-and-performance activities) and thus internalize new meanings and senses. Any intense-communication learning environment (speech, mimics, gestures, texts, images, moving images, animation, sound, intonation, music, dance, texture, etc. - in real and digital environments) is a prerequisite for dynamic learning about others and the world. This is extremely important in the education and communication of children with specific communication needs, because the resources of Facilitated Communication, are widely used as one of the alternative methods of communication and interaction for children with multiple disorders. (Georgieva, 2021). The combination of different communicative modes and resources is also a basis for designing a stimulating learning environment and a condition for the implementation of innovative pedagogical practices, such as in STEM learning settings, where learners are encouraged to explore, and their activity is stimulated by building their motivation through manipulative handson activity to reach the final product and experience satisfaction from the engineering work (Temnikova, 2023: 70).

So organized, pedagogical interactions in kindergarten exploit the transgressive functionality of multimodality as a communication phenomenon because they fully operationalize the "reflection-in-action" effect, defined as "the child's ability, with the teacher's help, to move back and forth between reflecting experience and contemplating experience" (Schön and Bamburger, 1991: 52).

Following the logic of the established educational strands and cores for preschool education, the proposed multimodal paradigm affirms the understanding that child development is approached holistically.

Table 1.
Meaning-centered field "Cognitive activity"

Field of indication	Subjective expression of pedagogical specialists
Promoting cognitive activity through support	• Responds to children's signals, actions and comments through a multifaceted (multimodal) two-way communication exchange; • Integrates the child's previous experiences by encouraging exploration, experimentation and creation and supports the child's relationships with significant others (adults and peers); • Facilitates the acquisition of new concepts and skills through questions, descriptions, prompts, stories, images, audio/visual messages and multimodal ensembles; • Supports children's tasks through the use of external mediators (verbal, visual, physical) to facilitate and support the child's autonomous development.
Utilizing the resources of artistic and creative activities (in real and digital environments) in the context of multimodal environmental design	• Stimulates children individually and collaboratively to use audio, verbal, visual and digital messages while drawing information from a variety of sources; • Provides resources and materials that prompt children to present ideas from the perspective of the building of shared understanding; • Encourages children to actively engage as listeners, viewers, authors and performers of multimodal designs; • Motivates children to experiment with the modal resources of different communicative modes and realize children's combinative thinking and imagination; • Supports the child's self-expression (performance, expression, competition, representation of situations, meanings, states, etc.) through involvement in artistic and creative activities; • Creates a primal base of "navigational" skills for learning in a global culture that is increasingly connected through powerful multimedia messages.

Providing propaedeutic cognitive development	• Creates prerequisites for the search and detection of signals and their determination as essential characteristics, features, properties and signs for the (re-)cognition of objects, processes and phenomena; the identification, generalization and systematization of information from multimodal environments and its subsequent transformation and encoding into mental images and representations, whose subsequent interpretation and use leads to the recoding and placement of information in and through different models. • Creates conditions for interpretation of the received array of information through: abstraction from specific multisensory information, visual representation of multisensory information, information encoding, recoding and decoding in and through models; indirect recreation of multisensory perceptions of real objects and phenomena through the development of various models. •Suggest sign-and-symbolic encoding and representation of the created cognitive product - model.
Tracking, filing and analysing of child development feedback for short-term and long-term planning of pedagogical interaction	• Monitors children's behaviour, tracks their specific interests (in cognitive, artistic, sporting and play activities) in order to transform the elements of the educational environment for their development and progress; • Organise the educational environment in accordance with the social and cultural context in order to achieve the best understanding of the conditions that enable children to develop creative and critical thinking skills; • Motivates cognitive activity by encouraging children's experience through using social and material resources to express meaning (oral speech, pauses, mimicry, gestural and spatial relations, verbal improvisations, instrumental, vocal and pictorial interpretations, mimetic or technological and visual modes: drawings, images, illustrations, videos and music, animation).

In its functionality, the multimodal kindergarten environment is oriented to the child's specific and unique world, which reflects the child's sociocultural belonging and also the child's acquired and inherent ways of sharing and successfully communicating with others. This allows the educational process "to focus on the trinity of the psychosocial self: knowledge, skills and values of children in pre-school age, and on the conditions in which they master them" (Dermendzhieva, Tasevska and Dyankova, 2022: 55).

Multimodal interactions create a heuristic and productive space for the early development of multimodal literacy by identifying core meaning-centred fields with the corresponding underlying concepts and indicators. Because of their specifics and autonomy, each meaning-centered field of interaction, given its underlying concepts, realizes its own added value in the formation of the psychosocial self in preschool age. The thesis that if the child has entered the "communicative state" and engages in multimodal educational interactions, s/he appropriates the social experience by forming a transgressive attitude of behavioral response, gains relevance. The meaning-centered field "Cognitive activity" stands out as a priority, whose basic concepts and indicators are described in Table 1.

Transgressive nature of pedagogical competence for designing multimodal environment for cognitive and creative activity

Within the context of the transgressive approach, each competence is designed as an internal self-consistency of elements and/or domains of such. A dynamic network is created whose boundaries are fluid enough. Clarifying the properties of the parts (competences integrating knowledge and skills in a specific context) is only possible by clarifying their relations in the dynamics of the whole (competence). It is an accepted view that no matter how well we describe the constituent elements of competence, only their integrity ensures effective behaviour (Delibaltova, 2004).

This understanding of the structural and functional unity and interconnectedness of the parts, as well as their derivability from the whole and vice versa, traces the way to a change in the understanding of competence (understood at its highest level of achieved expertise) as a framed concept and its formation and development in an educational context in compliance with a certain linear scheme, ensuring finiteness of dimension or strict hierarchy in the arrangement of the elements.

This new way lies in the search for opportunities for this to happen through the creation of transgressive zones of synergistic concentration of elements/spheres of the whole, in which elements simultaneously develop and create new ones in terms of networkedness, multilayeredness, complexity and spiraling growth.

The formation of competence in the teacher for designing a multimodal environment for cognitive

and creative activity opens up possibilities for overcoming the finiteness in definition, linearity in formation and liminality in the development of a competence through the continuous creation of transversal zones of cross-sections, generating new such zones and building on the basic ones.

This understanding of competence is analogous to the understanding of the human being as a system whose "theoretical universal commensurability with all other systems makes of itself an extremely complex system with multiple functional structures that are actualized under certain internal and external conditions". Under the conditions of the functioning of the human self, however much it may be "decomposed" into a "present self," a "dynamic self," a "fantastic self," a "possible self," an "idealized self," an "imaginable self," or an "ideal self," a person, according to A. Deikov, possesses a particularly characteristic quality - the quality of being aware of the boundary, of constructing boundaries, of crossing boundaries" (Dejkov, 2004: 154).

Multimodal as well as digital environments with their plasticity and fluidity, with the created sense of boundlessness and dynamic stability foster opportunities for creating and for crossing and/or pushing boundaries in personal development, but in the context of professional growth, the formation and development of competence to design multimodal environments for cognitive and creative activity, establishes the teacher as a transgressive person who is "expansive and creative, free and responsible, whose behavior is defined by his/her intentions and the will to achieve them by transgressing the boundaries of formed types of activities" (Kozielecki, 1987: 210).

This reframing of the understanding of the approach to the development of the teachers' competence to design multimodal environments for cognitive and creative activity (and it may be necessary for all transversal competences) is in line with Yana Merdzhanova's vision of the "individual in the XXI century and the following centuries", who "only by giving autonomy, is autonomous; only by balancing between metamorphoses, remains constant and stable; only by taking into account changes and following the direction, changes the Direction; only by living his many biographies, creates his unique biography; only by being, in this sense, an embryo at each moment of something new, does self-emerge and self-renew with his/her authentic root forces; ceasing to have a beginning, thus becoming a beginning; there are always reserves, because the open and included organism "charges" continuously, as it charges the environment; only by giving, it does continue" (Rasheva-Merdzhanova, 2014: 22). This, according to Yana Rasheva-Merdzhanova, happens not only when uniting: analytical-and-synthetic/logical-and-abstract thinking (which is deterministic, cause-effect-bound, hierarchizing and discriminating - dissecting things); creative (lateral, divergent, networked) thinking (seeing things in different positions and modes, from different perspectives - as a complex and within its context, but not always with a guarantee of its metamorphoses and evolution); artistic (associative, metaphorical, analogy-driven) thinking (which connects through the simultaneous use and classification of things), but also with the perspective of the genealogical vision, the depth is (dis-)covered; a sight is beheld, a picture taken, not just a snapshot, but one of a life path of a thing" (Rasheva-Merdzhanova, 2014: 73).

Naturally, this approach also requires a new type of thinking, which Rasheva-Merdzhanova calls "genealogical", the same being essentially transgressive, and the "genealogical person" she speaks of is also transgressive, because "s/he has a chance of bringing value the environment by integrating into it, which is also the result (product) of his/her interdisciplinary competence based on his/her interdisciplinary genealogical thinking", as "this type of thinking is specifically human, it continues to makes sense of all kinds of technological information and other kinds of logically powerful structures, and by hyperstructuring the information, but not only by logical mechanisms, but by the value-evaluative of the human complex critical attitude, the living human intelligence is a structuring, necessary partner of the artificial intelligence, as two complementary halves of the whole, and only then the computer-human system will become a social system in which the personality is the leading one, and not vice versa - a technical system in which the machine is the leading one" (Rasheva-Merdzhanova, 2014: 74).

Applying this type of thinking to the teacher's competence to design a multimodal environment for cognitive and creative activity, it should be seen as: "alive" (unframed), having a vital path (deep with many levels) that is embossed (growing along a fluid dynamic-resistant spiral) and has important points (base segments/spheres); there are centres (as transgressive zones with dynamic resilience) of metamorphoses, as starting points and transitions to other levels (emergent spheres), as well as critical points seen as potential new spheres. In the liminal spheres of the essentially deep structure, multiple beginnings are synergized as sources rather than starting/primary points, and multiple possible outcomes as continuations (aspects of transgressiveness - boundary offsets) rather than endpoints. Thus, there is a continuous dynamic of interdependencies with the environment and with constituent (disappearing and emerging) components, in which the teacher's competence to design a multimodal environment for cognitive and creative activity develops as transgressive, being continuously created in the cultivation of

new knowledge and new skills, expanding the subject's cognitive and practical limits.

Conclusion

It is the insight, the awareness of this relativization that conceptualizes the idea of forming competence in the teacher to design a multimodal environment whose functionality presupposes the cognitive and creative activity of the child in preschool age, taking into account and utilizing in synergy:

- The multifaceted forms of children's expression as the main element in social interactions;
- the multifaceted signification of language as a communicative entity in real and digital environments;
- the dynamic connectivity of information media as expressors of meanings and prerequisite for understanding;
- dialogical communication with the child to build on his/her visual, informational, multicultural, media and digital experiences in preschool.

Conflict of interests

The authors declare no conflict of interest.

Author Contributions

In accordance with the authorship criteria, S. Dermendzhieva and N. Tsankov certify that they participated with an equal degree of activity in developing the content and design of the submitted manuscript. The authors certify that they take public responsibility for the methodology of the present study: the concepts of multi-modality and multiliteracy - S.D., the concepts of transgressive personality behavior – N.Ts. Their analysis, their interdisciplinary interpretation is the result of the equal participation of the authors S. D. and N. Ts. in developing the concept of the transgressive essence of a multimodal educational environment. All authors have read and agreed to the published version of the manuscript.

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